

NAS ALAMEDA, INSTALLATION RESTORATION SITE 2

◆ PURPOSE

- Evaluate subsurface site conditions for future remedial action and associated construction activities (landfill cap)

◆ OBJECTIVE

- Location, identification and removal of Ordnance and Explosives Waste (OEW)
- Characterize existing soil covers
- Identify seismic hazards
- Perform preliminary engineering analysis

◆ SCOPE

- Ordnance and Explosive Waste (OEW) Characterization and Time Critical Removal Action
- Geotechnical and Seismic Investigation
- Geotechnical Feasibility Study



San Francisco

Oakland

Alameda Point
IR Site 2

INSTALLATION RESTORATION SITE 2 BACKGROUND

◆ PROJECT SITE

- IR Site 2 - 110 acres total, includes an additional investigation area between IR Sites 1 and 2 formerly used as a runway
- Portion of IR Site 2 (~77 acres) was used as a waste disposal area for NAS Alameda between 1956 to 1978
- Wetland area identified within IR Site 2 (~30 acres)
- IR Site 2 to be transferred to USFWS for use as a national wildlife refuge following design and construction of the recommended remedial alternative

ORDNANCE AND EXPLOSIVES WASTE (OEW) CHARACTERIZATION AND EMERGENCY REMOVAL ACTION

◆ SCOPE

- Location, identification and removal of any OEW on the ground surface within boundaries of IR Site 2
- Removal of OEW below the ground surface from the Possible OEW Burial Site located within IR Site 2

◆ KEY WORK ELEMENTS

- OEW Surface clearance
- OEW Below surface clearance (Time Critical Removal Action)

OEWS SURFACE CLEARANCE

◆ Visual reconnaissance

- Access roads, staging areas and support zones

◆ Vegetation removal to facilitate location of surface OEW

◆ Grid-by-Grid Surface Sweep

- Site grid established for ordnance characterization
- 200-foot by 200-foot surveyed grid
- Locations of items identified by northing and eastings distances

◆ Establishment of Exclusion Zones (EZ)

- Identification of where explosive hazards are likely to be present
- Most Probable Munition (MPM) identified that might be encountered at IR Site 2
 - ◆ 20-mm high explosive projectile

TECHNICIANS PERFORMING SURVEY OF SITE GRIDS FOR SURFACE SWEEP



DEMILITARIZED 20-MM TRAINER ROUNDS



TROMMEL PERFORMING SOIL SIFTING AT POSSIBLE OEW BURIAL SITE



OEW BELOW GROUND SURFACE CLEARANCE (TCRA)

- ◆ Possible OEW Burial Site ~ 2.5 acres
- ◆ Excavation below ground surface to depth of 1 foot
 - Technicians sweep excavation path with mine detectors
 - ◆ Significant magnetic anomalies removed
 - Soil removed in 6-inch lifts, one grid at a time
 - ◆ Technicians visually verified and monitored all cuttings for OEW
 - Mechanically screened to separate trash and debris
 - Screened soil used for backfill
 - ◆ Tailings visually inspected by technicians for presence of OEW prior to backfill placement
 - OEW recovered was demilitarized and disposed of as non-hazardous waste

GEOTECHNICAL AND SEISMIC INVESTIGATION

◆ KEY WORK ELEMENTS

- Field Investigation
- Geotechnical Soil Testing
- Geotechnical and Seismic Analysis

FIELD INVESTIGATION

- ◆ ON-SHORE AND OFF-SHORE DRILLING
- ◆ EXPLORATORY TEST PITS
- ◆ CONE PENETROMETER TESTING
- ◆ TOPOGRAPHIC AND BATHYMETRIC SURVEYS
- ◆ WETLANDS DELINEATION

GEOTECHNICAL SOIL TESTING

- ◆ **STRENGTH PARAMETERS**
- ◆ **SOIL CLASSIFICATION**
- ◆ **SETTLEMENTS**
- ◆ **BEARING CAPACITY**

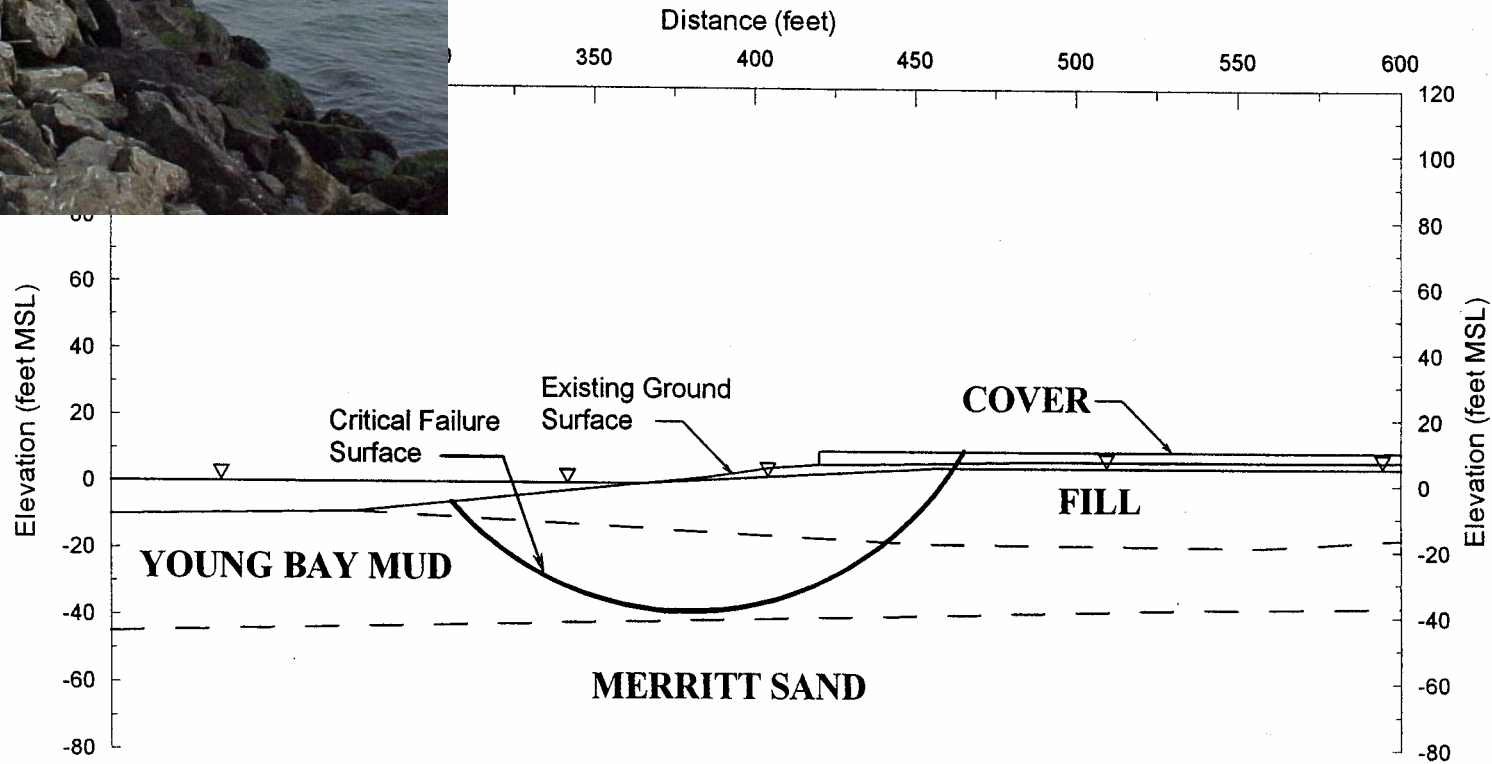
GEOTECHNICAL AND SEISMIC ANALYSIS

- ◆ LIQUEFACTION EVALUATION
- ◆ SLOPE STABILITY
- ◆ GROUND RESPONSE ANALYSIS

PERIMETER SLOPES AND POTENTIAL SLOPE FAILURE AT IR SITE 2

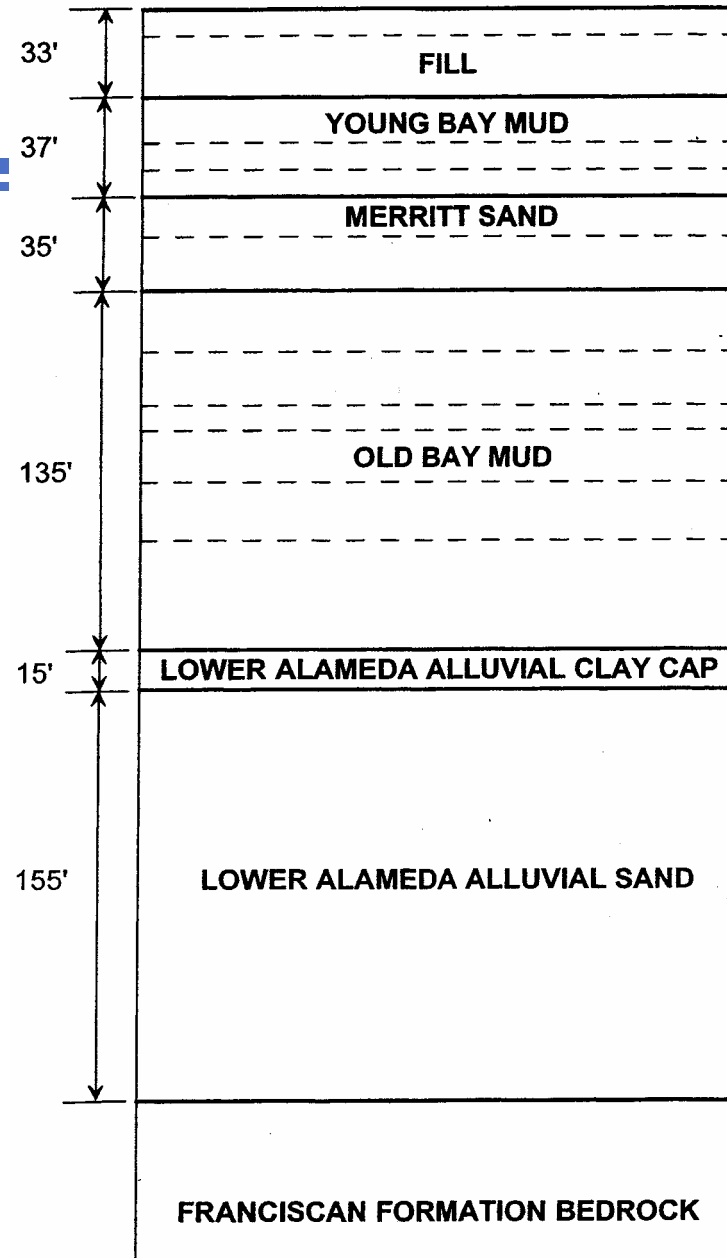


PERIMETER SLOPE
AT IR SITE 2



POTENTIAL
SLOPE
FAILURE
(TYPICAL)

Subsurface Profile for Ground Response Analysis



GEOTECHNICAL AND SEISMIC HAZARDS IR SITE 2

◆ LIQUEFACTION POTENTIAL

- Fill material classified as liquefiable
- Seismically-induced settlements estimated up to 18 inches (Generally accepted differential settlement of structures < 1 inch)
- Liquefaction-induced lateral displacements approximately 20 ft. (Generally accepted lateral displacements < 1 ft.)

◆ SLOPE INSTABILITY (with soil cover)

- Static FS between 1.46 and 2.58 (State of practice, Factor of Safety > 1.5)
- Post-EQ static FS between 0.86 and 1.94 (USACE guidelines, Factor of Safety > 1)
- Predicted permanent lateral deformations of 4 to 19 ft. (Generally accepted lateral displacements for slopes supporting structures < 6 inches)

GEOTECHNICAL FEASIBILITY STUDY (FS) AT IR SITE 2

◆ OBJECTIVE

- Prevent release of waste into San Francisco Bay

◆ PERFORMANCE CRITERIA

- Limit permanent lateral displacements to 4 feet

◆ EVALUATE REMEDIAL ALTERNATIVES

- CERCLA Guidelines and EPA Screening Criteria Identified
- General Response Actions - (1) Soil improvement and (2) Physical buttresses
- Developed 20 remedial alternatives

PROPOSED ALTERNATIVES

Alternative No.	Description	Type of Response Action		
		Soil Improvement	Physical Buttress	Combined Method
1	Wick Drains with Surcharge	X		
2	Stone Columns with Surcharge	X		
3	Sheet Piles with Anchors		X	
4	Stone Columns with Surcharge and Sheet Piles			X
5	Soil Cement Gravity Wall and Stone Columns	X		
6	Concrete Wall		X	
7	Excavation with Riprap		X	
8	Drilled Concrete Piers with Stone Columns			X
9	Pre-cast Concrete Piles		X	
10	Wick Drains with Surcharge and Sheet Piles			X
11	Excavation along Shoreline and Soil Backfill	X		
12	Partial In Situ Solidification	X		
13	Soil Bentonite Cutoff Wall		X	
14	Riprap Embankment in the Bay and Soil Backfill	X		
15	Inclined Timber Piles		X	
16	Consolidation with Surcharge	X		
17	Wick Drains with Vacuum	X		
18	Vibrated Beam Cement Bentonite Cutoff Wall		X	
19	Vibrated Beam Impermix Cutoff Wall		X	
20	Soil Cement Gravity Wall			X

SELECTED REMEDIAL ALTERNATIVES AT IR SITE 2

◆ RECOMMENDED ALTERNATIVE

- Alternative #5: Soil Cement Gravity Wall and Stone Columns
 - ◆ Construction of a 17- to 38- foot wide soil cement gravity wall in the Young Bay Mud layer and installation of stone columns in the fill layer
 - ◆ Provides for reduction of liquefaction potential and containment of liquefiable soils behind the improved soil zone

SOIL CEMENT GRAVITY WALL WITH STONE COLUMNS

